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(54) METHOD OF MANUFACTURING RESIN COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method of manufacturing a resin composition which has superior gas barrier and appearance characteristics, furthermore superior processability for secondary processing.

SOLUTION: The resin composition is manufactured by blending in a molten state a saponified copolymer of ethylene-vinyl acetate (A) which has water content of 50 wt.% or less, a water swellable, lamellar inorganic compound (B) and a water-soluble resin (C).

LEGAL STATUS

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[0033] A: 100 wt% by Pts
 B: 0.1-20 wt% by Pts

[0039] residual time in extruder:
 10-600 sec

[0045] layered product

[0013] B: most moisture

[0038] twin-screw extruder 40-20-80

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of a resin constituent of having excelled in gas barrier property or an appearance property, and having excelled also in secondary elaboration nature further in more detail, about the manufacture approach of the resin constituent which consists of an ethylene-vinylacetate copolymer saponification (object A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C).

[0002]

[Description of the Prior Art] Generally, the ethylene-vinylacetate copolymer saponification object (it is hereafter written as EVOH) is excellent in transparency, antistatic nature, oilproof, solvent resistance, gas barrier property, a smell retaining property, etc., and is thermoplastics in which melting shaping is possible, and is used for various wrapping applications, such as food packing. And to blend an inorganic substance with EVOH is tried aiming at the further improvement of gas barrier property. For example, mixing EVOH and water bloating tendency phyllosilicate under existence of water is indicated by JP,5-39392,A.

[0003]

[Problem(s) to be Solved by the Invention] However, as a result of this invention person's etc. examining an indication technique given in the above-mentioned official report in a detail, in order to supply water bloating tendency phyllosilicate to the bottom of existence of water and to add the water / alcoholic solution of EVOH further with this technique, it was difficult to be easy to generate the so-called insoluble, therefore to distribute to water bloating tendency phyllosilicate homogeneity, and it became clear that the time amount which it is going to make carry out homogeneity distribution, or becomes was needed.

[0004] Moreover, also in gas barrier property, with this technique, it is only barrier property evaluation of the layered product which carried out the laminating of the polypropylene to the inside-and-outside layer, and is a monolayer, and it is thought that the room of an improvement is still more under high humidity, and it is not further taken into consideration about the secondary elaboration nature at the time of using for a container application with this indication technique, either, but the further improvement of gas barrier property or appearance nature and improvement in secondary elaboration nature are also going to just desire.

[0005]

[Means for Solving the Problem] As a result of repeating research wholeheartedly in view of the above-mentioned situation, this invention person etc. Then, EVOH (A), In manufacturing the resin constituent which comes to contain a water bloating tendency stratified inorganic compound (B) and water soluble resin (C) By carrying out melting mixing of the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content, it finds out that the above-mentioned technical problem is solvable, and came to complete this invention. Moreover, in this invention, in the above-mentioned approach, when presenting melting mixing with EVOH (A) of

50 or less % of the weight of water content with a water bloating tendency stratified inorganic compound (B) and the mixture which removed moisture from the mixed aqueous liquid of water soluble resin (C), or this mixed aqueous liquid (desiccation), it becomes possible to acquire the operation effectiveness of this invention notably.

[0006] In addition, about the water content of EVOH said by this invention, a resin constituent, mixture, etc., it is measured and computed by the following approaches.

weighing capacity (W2: unit g) of the weight after make it cool radiationally in a desiccator further for 30 minutes after put [measuring method of water content] objects (EVOH, a resin constituent, mixture, etc.) into the hot blast oven mold drier maintained by 150 degrees C after weighing capacity (W1: unit g) with the electronic balance and dry them for 5 hours be carry out similarly, and it compute from the following (3) types.

Water content (%) = $\{(W1 - W2) / W1\} \times 100 \dots (3)$

[0007]

[Embodiment of the Invention] Below, this invention is explained at a detail. Especially as EVOH (A) used for this invention, although not limited, an ethylene content is desirable, and if this ethylene content becomes inadequate [less than / 5 mol % / a water resisting property] and it exceeds 60-mol % conversely, it falls and is not desirable [a content / gas barrier property]. 5 - 60 mol% (further 10-60 mol %, especially 20-55 mol %, especially 25-50 mol %) of]

[0008] Moreover, more than 90 mol % (95 more mol % more than, especially 99-mol % more than, especially 99.5-mol % more than) of whenever [saponification / of a vinyl acetate component] is desirable, and whenever [this saponification] becomes [gas barrier property or thermal resistance] inadequate less than [90 mol %] and is not desirable.

[0009] Above EVOH (A) may copolymerize the ethylenic unsaturated monomer which can be copolymerized in the range (or less about 10 mol %) which does not check the effectiveness of this invention. As this monomer Olefins, such as a propylene, 1-butene, and isobutene, an acrylic acid, A methacrylic acid, a crotonic acid, a phthalic acid (anhydrous), a maleic acid (anhydrous), (Anhydrous) partial saturation, such as an itaconic acid, -- the monochrome of acids, its salt, or carbon numbers 1-18, or dialkyl ester -- Acrylamide, N-alkyl acrylamide of carbon numbers 1-18, N,N-dimethylacrylamide, Acrylamides, such as 2-acrylamide propane sulfonic acid or its salt, acrylamide propyl dimethylamine, its acid chloride, or the 4th class salt of its Methacrylamide, N-alkyl methacrylamide of carbon numbers 1-18, N and N-dimethyl methacrylamide, 2-methacrylamide propane sulfonic acid, or its salt, Methacrylamide, such as methacrylamide propyl dimethylamine, its acid chloride, or the 4th class salt of its N-vinyl amides, such as N-vinyl pyrrolidone, N-vinyl formamide, and N-vinyl acetamide Vinylcyanides, such as acrylic nitril and methacrylic nitril, the alkyl vinyl ether of carbon numbers 1-18, Vinyl ether, such as hydroxyalkyl vinyl ether and alkoxy alkyl vinyl ether Halogenation vinyl, such as vinyl chloride, vinylidene-chloride, and vinyl fluoride, vinylidene fluoride, and vinyl bromide Vinylsilane, such as trimethoxy vinylsilane, an acetic-acid allyl compound, an allyl chloride, Allyl alcohol, dimethyl allyl alcohol, TORIMECHIRU -(3-acrylamide-3-dimethyl propyl)- An ammonium chloride and acrylamide-isobutane sulfonic acid etc. is mentioned. Moreover, in the range which does not spoil the meaning of this invention, even if urethane-izing, acetalization, cyanoethylation, etc. back-denaturalize, it does not interfere.

[0010] In this invention, if in manufacturing the resin constituent made into the purpose it is required to prepare the water content of EVOH (A) to 50 or less % of the weight and this water content exceeds less than 50 % of the weight, a lot of water will blow off from EVOH (A), it will become impossible to process it at the time of melting mixing, and effectiveness of this invention will not be demonstrated. Although not limited, it is desirable to consider as 10 % of the weight, at less than 10 % of the weight, the apparent melting point of EVOH (A) needs to become high, this water content needs to make laying temperature of an extruder high, and, as a result, especially the minimum of this water content does not foam and have a desirable resin constituent. Moreover, as for especially the upper limit of the water content of EVOH (A), it is desirable to consider as 35 % of the weight further 40% of the weight, and, as for especially a minimum, it is conversely desirable to consider as 15 % of the weight further 12.5% of

the weight.

[0011] As an approach of making EVOH (A) containing water Although not restricted especially, as an approach which it is desirable to make homogeneity contain water and requires it into EVOH (A) How to deposit the solution of EVOH (A) underwater, to fully rinse, to remove a solvent, and to make water contain, The approach of processing EVOH (A) in pressurization hot water for about 1 to 3 hours, the method of depositing the paste after saponification of an ethylene-vinylacetate copolymer underwater, and making water contain at the time of manufacture of EVOH (A), etc. are mentioned. The method of depositing the paste after saponification of an ethylene-vinylacetate copolymer underwater is preferably used also especially in the above at the time of EVOH(A) manufacture. In addition, only by mixing EVOH and water, since water is not contained in homogeneity in EVOH, effectiveness of this invention cannot be demonstrated.

[0012] Especially as a water bloating tendency stratified inorganic compound (B) used for this invention, without being restricted, clay minerals, such as a smectite and a vermiculite, synthetic mica, etc. are mentioned, and a montmorillonite, beidellite, nontronite, saponite, hectorite, a sauconite, a SUCHIBUN site, etc. are mentioned as an example of the former smectite. These may be natural things or could be compounded. In this invention, the larger one of the degree of swelling (it measures according to the standard-testing-method constant volume method of Japanese bentonite Semiconductor Equipment & Materials International) of the above-mentioned water bloating tendency stratified inorganic compound (B) is desirable, it is desirable that degree of swellings are 85ml / 2g or more (90 moreml / 2g or more, especially 95ml / 2g or more), and this degree of swelling becomes [gas barrier property] inadequate in 85ml / less than 2g and is not desirable.

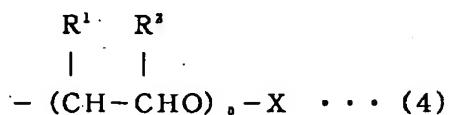
[0013] If this degree of swelling is taken into consideration, a montmorillonite is desirable as a water bloating tendency stratified inorganic compound (B). Moreover, water bloating tendency fluorine mica system minerals, such as a Na mold fluorine 4 silicon mica, Na mold TENIO light, Li mold TENIO light, and Na mold hectorite, are also used preferably. Moreover, although especially the aspect ratio of a water bloating tendency stratified inorganic compound (B) is not limited, it is desirable that it is 500 or more.

[0014] Although starch, a cellulose, a polyvinyl pyrrolidone, a polyethylene glycol, polyvinyl alcohol system resin, water-soluble nylon, polyacrylamide, etc. can be mentioned and polyvinyl alcohol system resin and water-soluble nylon are suitably used as water soluble resin (C) used by this invention, it is not limited to these.

[0015] Although what usually saponifies the polyvinyl acetate which carried out the polymerization of the vinyl acetate as this polyvinyl alcohol system resin, and is manufactured is used, the polyvinyl alcohol system resin which it is not necessarily limited to this, and little unsaturated carboxylic acid (a salt, ester, an amide, nitril, etc. are included), olefins, vinyl ether, a partial saturation sulfonate, etc. could contain the component in which vinyl acetate and copolymerization are possible in this invention, and contained especially the oxy-alkylene group is desirable.

[0016] Whenever [saponification / of polyvinyl alcohol system resin / 85-99.5 mol % (further 93-99.3 mol %, especially 96-99.2 mol %) of] is desirable, and if thermal resistance falls less than [85 mol %] and whenever [this saponification] exceeds 99.5-mol % conversely, it is [a possibility of the melting point becoming high too much, and it being necessary to raise melting temperature, and causing the heat deterioration of a resin constituent] and is not desirable. Moreover, 300-700 (further 350-600, especially 380-550) are desirable, and if melt viscosity becomes [this average degree of polymerization] low too much less than by 300, compatibility with EVOH (A) falls and average degree of polymerization exceeds 700 conversely, it falls [melt viscosity becomes high too much and / compatibility with EVOH (A)] in this case and is not desirable. Moreover, the content of this radical in the case of oxy-alkylene group content polyvinyl alcohol system resin is desirable, and if the melting point and decomposition temperature of this resin become [this content] near less than [0.1 mol %], extrusion nature falls and it exceeds five-mol % conversely, it becomes disadvantageous economically and is not desirable. [0.1-5 mol % (further 0.5-4 mol %, especially 1-3 mol %) of]

[0017] In addition, this oxy-alkylene group is expressed with the following general formula (4).



[0018] [However, in R1 and R2, hydrogen or an alkyl group, and X show the organic residue of hydrogen, an alkyl group, an acyl group, an alkylamide radical, or a sulfonate radical, and n shows the integer of 1-300.]

the above -- setting -- X -- usually -- hydrogen -- it is -- the number of n -- advantageous -- 2-300 -- about five to 300 oxy-alkylene group is especially preferably practical, and a polyoxyethylene radical, a polyoxypropylene radical, etc. are effective.

[0019] The polyvinyl alcohol system resin containing this oxy-alkylene group can be manufactured by the approach of arbitration. For example, to the bottom of existence of ** polyoxyalkylene, the polymerization of the vinyl ester is carried out, the partial saturation monomer and vinyl ester which have the approach of saponifying and ** oxy-alkylene group are copolymerized, and the approach of saponifying etc. is listed. As this partial saturation monomer, polyoxyethylene (meta) acrylate, Acrylic ester, such as polyoxypropylene (meta) acrylate (meta), A polyoxyethylene (meta) acrylic-acid amide, a polyoxypropylene (meta) acrylic-acid amide, Acrylic-acid (meta) amides, such as polyoxyethylene (1-(meta) acrylamide -1, 1-dimethyl propyl) ester, Vinyl ether, such as the allyl compound (meta) ether, such as the polyoxyethylene (meta) allyl compound ether and the polyoxypropylene (meta) allyl compound ether, and polyoxypropylene vinyl ether, etc. can be mentioned.

[0020] Moreover, although formic-acid vinyl, vinyl acetate, trifluoroacetic acid vinyl, propionic-acid vinyl, butanoic acid vinyl, capric-acid vinyl, lauryl acid vinyl, BASA tick acid vinyl, palmitic-acid vinyl, stearin acid vinyl, etc. are used by independent or concomitant use as the above-mentioned vinyl ester, vinyl acetate is suitable practically.

[0021] As this water-soluble nylon, the nylon which has tertiary amine in a principal chain or a side chain, the nylon which has a polyalkylene glycol component in a principal chain can be mentioned. As nylon which has tertiary amine in a principal chain or a side chain The polyamide of the diamine and the dicarboxylic acid, such as an adipic acid and a sebacic acid, which have tertiary amine, such as an aminoethyl piperazine and a bis-aminopropyl piperazine, in a principal chain, And the copolymerization polyamide of these and lactams, the polyamide from the lactam which has tertiary amine in a side chain like alpha-dimethylamino-epsilon caprolactam, and as nylon which can mention the copolymerization polyamide of this and other lactams etc., and has a polyalkylene glycol component in a principal chain The polyamide of the diamine and the dicarboxylic acid, such as an adipic acid and a sebacic acid, which have with a molecular weight of about 200 to 4000 polyethylene glycols in intramolecular, the copolymerization polyamide of these and lactams, etc. can be mentioned.

[0022] By this invention, it is characterized [greatest] by carrying out melting mixing of the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content, and obtaining the target resin constituent, and the approach is explained concretely.

[0023] In carrying out melting mixing of above-mentioned (A) - (C) There is especially no limit. To a package, feed the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content into melting mixing equipment, or Or although what blended beforehand any two kinds in an EVOH[of 50 or less % of the weight of water content] (A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C), and other one sort may be supplied to melting mixing equipment The mixed aqueosity liquid obtained in this invention by the approach of presenting melting mixing with the mixed aqueosity liquid of 1 water bloating tendency stratified inorganic compound (B) and water soluble resin (C), or 1 which takes two is dried. Although the method of presenting melting mixing with the obtained mixture is desirable and how to start is explained concretely, it is not limited to these.

[0024] How in enforcing the approach of 1) to prepare the water dispersion of a water bloating tendency

stratified inorganic compound (B), and the water solution of water soluble resin (C) beforehand, to mix these, and to obtain mixed aqueous liquid. The approach of mixing water soluble resin (C) to the water dispersion of the water bloating tendency stratified inorganic compound (B) prepared beforehand, and obtaining mixed aqueous liquid, the method of making the water solution of the water soluble resin (C) prepared beforehand carry out mixed distribution of the water bloating tendency stratified inorganic compound (B), and obtaining mixed aqueous liquid, etc. can be mentioned. In preparing the water dispersion of this water bloating tendency stratified inorganic compound (B), that what is necessary is just to stir using well-known stirring equipment, in order to raise dispersibility further, high-pressure distribution equipments, such as an extra-high voltage homogenizer, a ball mill, sonication equipment, etc. can also be used.

[0025] Although there is especially no limit about the concentration of this water dispersion, it is 0.1 - 10 % of the weight (further 0.5 to 9% of the weight). It is desirable that it takes for 2 - 8 % of the weight one to 8.5% of the weight especially. This concentration at less than 0.1 % of the weight If the whole water content will increase too much, workability will fall, if it is going to secure the content of (B) in a resin constituent, and 10 % of the weight is exceeded conversely, the dispersibility of a water bloating tendency stratified inorganic compound (B) falls and is not desirable. Moreover, what is necessary is just to stir using well-known stirring equipment in preparing the water solution of water soluble resin (C).

[0026] Although there is especially no limit about the concentration of this water solution, it is 0.1 - 10 % of the weight (further 0.5 to 9% of the weight). It is desirable that it takes for 2 - 8 % of the weight one to 8.5% of the weight especially. If this concentration tends to secure the content of the water bloating tendency stratified inorganic compound in a resin constituent (B) at less than 0.1 % of the weight, the whole water content will increase too much and the workability at the time of melting mixing will fall. Conversely, if 10 % of the weight is exceeded, the dispersibility of a water bloating tendency stratified inorganic compound (B) falls and is not desirable.

[0027] What is necessary is for the approach of 2) to dry the mixed aqueous liquid of a water bloating tendency stratified inorganic compound (B) and water soluble resin (C) obtained by the above 1 (for moisture to be removed), and just to dry it so that this mixed aqueous liquid may be left in an about 80-120-degree C dryer and water content may become 0.1 - 5 % of the weight (further 0.1 - 3 % of the weight, especially 0.1 - 1 % of the weight) in this desiccation that what is necessary is just to obtain mixture.

[0028] Although especially the mixed rate of the water bloating tendency stratified inorganic compound (B) in above 1 and 2 and water soluble resin (C) is not limited As for this mixed rate (B/C), it is desirable that it is 40 / 60 - 90/10 (further 45 / 55 - 85/15, especially 50 / 50 - 80/20) (all are weight ratios). It becomes [the dispersibility of a water bloating tendency stratified inorganic compound (B)] inadequate and is not desirable, if the gas barrier property under the high humidity of the resin constituent with which this mixed rate is obtained less than by 40/60 falls and 90/10 is exceeded conversely.

[0029] Next, the concrete melting mixing approach is explained. In carrying out melting mixing of this invention, there is especially no limit, for example, can perform it using well-known melting kneading (mixing) equipments, such as a melting extruder, kneader RUDA, a roll mill, a Banbury mixer, and a PURASUTO mill, but Usually, although it is desirable on industry to use the extruder of a monopodium or two shafts, a twin screw extruder is suitably used especially in respect of the stability of melting kneading and the approach using this twin screw extruder is further explained to a detail, it is not limited to this.

[0030] Especially as a twin screw extruder to be used, although not limited, a thing 20mm or more (further 30-150mm) has a desirable bore. This bore in less than 20mm Since it is lacking in productivity, preferably ratio of length to diameter 20-80 (further 30-60) are desirable, and if this diameter of ratio of length to diameter may be insufficient for mixed capacity by less than 20 and 80 is exceeded conversely, the residence time within the extruder of resin will become long beyond the need, and we are anxious about the heat deterioration, and it is not desirable.

[0031] In supplying the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content to a twin screw extruder, there is especially no limit like the above, but if the above-mentioned approach of 1 and 2 is explained ** EVOH of an approach and 50 or less % of the weight of ** water content which supplies the mixture which blended the mixed aqueous liquid or mixture of (B+C) with EVOH (A) of 50 or less % of the weight of water content beforehand to the hopper of this extruder (A), How to supply the mixed aqueous liquid or mixture of (B+C) to the hopper of this extruder directly, ** Although the approach (side feed) of supplying the mixed aqueous liquid or the mixture organic substance of while supplying EVOH (A) of 50 or less % of the weight of water content to the hopper of this extruder (B+C) from a part of barrel of this extruder etc. can be mentioned ** An approach is desirable, and in performing the approach of starting, the mixed aqueous liquid or mixture of ** (B+C) can also be supplied, supplying from a vent-port using gravity, or putting a pressure.

[0032] in addition, this invention -- setting -- the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content -- when carrying out melting mixing of the mixed aqueous liquid, or (B+C) It is 20 - 60 % of the weight (further 22.5 to 50% of the weight) about the water content of the whole resin constituent at the time of mixing. It is desirable to consider as 25 - 45 % of the weight especially, and if this water content becomes insufficient [less than 20 % of the weight / the dispersibility of (B)] and exceeds 60 % of the weight conversely, EVOH (A) and (B) are in the uneven mixed state and are not desirable.

[0033] Moreover, the blending ratio of coal of EVOH (A) with which melting mixing is presented, and a water bloating tendency stratified inorganic compound (B) the EVOH(A) 100 weight section (solid content) -- receiving -- this water bloating tendency stratified inorganic compound (B) -- 0.1 - 20 weight section (solid content) (further 0.5 - 15 weight sections (this left) --) If it is desirable that it is 1 - 10 weight section (this left), and this blending ratio of coal has few improvement effects of gas barrier property under at the 0.1 weight section and exceeds 20 weight sections conversely especially, the appearance of moldings, such as a film, gets worse and is not desirable.

[0034] In addition, in carrying out melting mixing of this invention using the above-mentioned approach of 1, in this invention, it is also desirable to choose EVOH (A) so that the conditions of following the (1) type may be satisfied. The extrusion nature and gas barrier property at the time of melting mixing become good by preparing so that whenever [ethylene content / of EVOH (A) / and saponification], and water content may satisfy following the (1) type. In addition, the upper limit of the water content of EVOH (A) when applying following the (1) type is 40 % of the weight.

[0035] That is, if EVOH (A) and a water bloating tendency stratified inorganic compound (B) will be [the value of (1) type] in the uneven mixed state less than by 75, gas barrier property falls and 135 is exceeded conversely, the extrusion nature at the time of melting mixing falls and is not desirable.

$$75 \leq (0.173 \times S_v - 20.111) \times W + 0.2184 \times (S_v - 100)^2 + 6.5356 \times (S_v - 100) + 230.67 \times \exp(-0.0074 \times E_t) \leq 135 \dots (1)$$

However, E_t : ethylene content (mol %), S_v : It is W : water content (% of the weight) whenever [saponification] (mol %).

[0036] Moreover, in carrying out melting mixing of this invention using the above-mentioned approach of 2, it is also desirable to choose EVOH (A) so that the conditions of following the (2) type may be satisfied. The extrusion nature and gas barrier property at the time of melting mixing become good by preparing so that whenever [ethylene content / of EVOH (A) / and saponification], and water content may satisfy following the (2) type.

[0037] That is, if EVOH (A) and a water bloating tendency stratified inorganic compound (B) will be [the value of (2) types] in the uneven mixed state less than by 60, gas barrier property falls and 120 is exceeded conversely, the extrusion nature at the time of mixing falls and is not desirable.

$$60 \leq (0.173 \times S_v - 20.111) \times W + 0.2184 \times (S_v - 100)^2 + 6.5356 \times (S_v - 100) + 230.67 \times \exp(-0.0074 \times E_t) \leq 120 \dots (2)$$

However, E_t : ethylene content (mol %), S_v : It is W : water content (% of the weight) whenever [saponification] (mol %).

[0038] Although a twin screw extruder is presented with the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content and melting mixing is carried out in this way About the configuration of a dice hole prepared in the outlet of an extruder although not limited -- moderate configuration and magnitude [-- in the case of-like [cylinder], if it takes into consideration that a path obtains 1-10mm and the resin constituent pellet with a die length of 1-10mm of thing (further respectively 2-6mm thing)] A 1-7mm (further 2-5mm) round shape has a desirable diameter, and the number of the holes has desirable 3-100-piece (further 10-50 pieces) extent on production. Furthermore, it is also desirable to form a mesh-like screen one or more (especially two or more sheets) sheets between an extruder and a dice entry because of tailing and resin pressure force stabilization (stabilization of extrusion), and if extrusion stability is taken into consideration, it is also still more desirable to prepare a gear pump, a heat exchanger, etc. similarly.

[0039] In carrying out melting kneading, especially the temperature of melting mixing is not limited, but usually It is desirable to give a temperature gradient within an extruder, and it is a temperature setting zone just behind the bottom of a hopper 50-70 degrees C (further 50-65 degrees C) It is desirable to consider as 50-60-degree-C extent, to make a temperature setup of the pars intermedia after it into 15-60-degree-C height from it just behind the bottom of a hopper, and to set up the laying temperature of the extruder outlet section in front of a dice 0-40-degree-C lowness from that of pars intermedia especially. The residence time in the inside of the extruder of a resin constituent is chosen from the range for 10 - 600 seconds (further 20 - 300 seconds, especially 30 - 240 seconds). This residence time moreover, in less than 10 seconds If sufficient mixing may not be able to be performed and 600 seconds is exceeded conversely, the quality of a resin constituent falls and is not desirable. It becomes [extrusion] unstable and is not desirable, if it is chosen from the range of 5-300kg/cm² (further 10-200kg/cm²) about the pressure (resin pressure) put on a resin constituent and this pressure exceeds less than 5kg/cm² and 300kg/cm². Moreover, in order to prevent the heat deterioration of a resin constituent, it is also desirable to carry out the N₂ seal of the inside of a hopper or the circumference of Bento.

[0040] The rotational frequency of a screw is chosen from the range of 50 - 500rpm (further 80 - 400rpm). This rotational frequency moreover, in less than 50 rpm What is necessary is for the quality of a resin constituent to deteriorate, and for there to be especially no limit about the brewing rate of EVOH (A) of 50 or less % of the weight of water content, and just to decide preferably, that it will be arbitration by the diameter of a barrel of an extruder etc.; if mixed capacity may become inadequate and 500rpm is exceeded conversely. Moreover, what is necessary is just to supply according to above EVOH (A) about the brewing rate of a water bloating tendency stratified inorganic compound (B) and water soluble resin (C), so that the water bloating tendency stratified inorganic compound in the resin constituent made into the purpose (B), the loadings of water soluble resin (C), etc. may be suited.

[0041] Although the resin constituent by which melting mixing was carried out is supplied subsequently to a dice and extruded the temperature of the resin constituent within a dice becomes 80-100 degrees C (further 85-100 degrees C) -- as -- extrusion conditions (laying temperature --) It is also desirable to adjust a screw configuration, a screw speed, etc., and if extrusion may become [this temperature] unstable at less than 80 degrees C and 100 degrees C is exceeded conversely, the quality of a resin constituent falls and is not desirable.

[0042] The resin constituent by which melting mixing was carried out in this way is extruded from a strand die, it is cooled and cut, and the resin constituent (pellet) which is carried out and targets desiccation processing after that is obtained. As this desiccation processing, it is possible to adopt the various desiccation approaches, for example, fluidized drying and standing desiccation can be performed. As this fluidized drying As an oven for meaning the desiccation performed while churning distribution of the resin constituent (pellet) is substantially carried out by hot blast mechanically, and performing this desiccation A cylinder and an agitated trough dryer, a drum-drying machine, a rotary dryer, a fluidized-bed dryer, an oscillating fluidized-bed dryer, a conical rotation mold oven, etc. are mentioned. As standing desiccation As an oven for a resin constituent (pellet) meaning substantially the desiccation performed without the ability giving a dynamic operation of churning, distribution, etc., and performing this desiccation As an ingredient standing mold, although a batch process core box drier can

mention a band dryer, a tunnel dryer, a vertical-type silo drier, etc. as a work handling mold, it is not limited to these.

[0043] It becomes [if it is desirable to **** the water content of a resin constituent (pellet) to 0.1 - 3% of the weight (further 0.1 - 1 % of the weight, especially 0.1 - 0.5 % of the weight), this water content becomes poor / thermal resistance / at less than 0.1 % of the weight and 3 % of the weight is exceeded conversely, will become insufficient / degassing / at the time of shaping, and] the cause of poor shaping, such as foaming, by this desiccation processing, and is not desirable. As the other desiccation approaches, when carrying out melting mixing of the resin constituent with an extruder, direct moisture can also be removed from a vent.

[0044] The resin constituent (pellet) obtained by the manufacturing method of this invention in this way It is used abundantly at the application of a moldings. With melting shaping etc. A film, a sheet, a container, It is fabricated by fiber, a rod, tubing, various mold goods, etc., and melting shaping can also be again presented using such grinding articles (when carrying out the reuse of the recovery article etc.). As this melting shaping approach Extrusion methods (T-die extrusion, inflation extrusion, blow molding, melt spinning, variant extrusion, etc.) and an injection-molding method are mainly adopted. Melting molding temperature is chosen from the range of 150-300 degrees C in many cases.

[0045] moreover, at least one side of the layer which can fully demonstrate the operation effectiveness of this invention when especially the moldings of a layered product is presented, and specifically consists of this resin constituent although the resin constituent (pellet) obtained by the manufacturing method of this invention can be used as a moldings of a simple substance -- a thermoplastics layer etc. -- a laminating -- carrying out -- a multilayer -- a layered product -- using as a moldings is useful.

[0046] In manufacturing this layered product, carry out the laminating of other base materials to one side or both sides of a layer which consist of this resin constituent, but How to carry out melting extrusion of the thermoplastics to the film which consists of this resin constituent, for example, or a sheet as the laminating approach, Conversely, the approach of carrying out melting extrusion of this resin constituent to base materials, such as thermoplastics, the approach of co-extruding this resin constituent and other thermoplastics, Furthermore, the approach of carrying out dry laminate of the film and sheet which consist of a resin constituent of this invention, and the film of other base materials and a sheet using well-known adhesives, such as an organic titanium compound, an isocyanate compound, a polyester system compound, and a polyurethane compound, etc. is mentioned. Moreover, as for the resin constituent (pellet) obtained by the manufacturing method of this invention, it is also desirable to present co-extrusion molding.

[0047] As other party resin in co-extrusion, polyolefine system resin, polyester system resin, polyamide system resin, a copolymerization polyamide, polystyrene system resin, polyvinyl chloride system resin, a polyvinylidene chloride, acrylic resin, vinylester resin, a polyester elastomer, a polyurethane elastomer, chlorinated polyethylene, chlorination polypropylene, aromatic series and an aliphatic series poly ketone, aliphatic polyalcohol, etc. are mentioned, and polyolefine system resin is used suitably.

[0048] As this polyolefine system resin, concretely Straight chain-like low density polyethylene (LLDPE), Low density polyethylene (LDPE), super-low density polyethylene (VLDPE), Medium density polyethylene (MDPE), high density polyethylene (HDPE), An ethylene-vinylacetate copolymer (EVA), an ionomer, an ethylene-propylene (block or random) copolymer, An ethylene-acrylic-acid copolymer, an ethylene-acrylic ester copolymer, An ethylene-methacrylic-acid copolymer, an ethylene-methacrylic ester copolymer, A polypropylene and propylene-alpha olefin (alpha olefin of carbon numbers 4-20) copolymer, Independent or the copolymer of olefins, such as polybutene, the poly pentene, and the poly methyl pentene, Or the polyolefine system resin of wide senses, such as independent or the things which carried out graft denaturation of the copolymer with unsaturated carboxylic acid or its ester of these olefins, and these blend objects, can be mentioned. Especially, straight chain-like low density polyethylene (LLDPE), low density polyethylene (LDPE), Super-low density polyethylene (VLDPE), an ethylene-vinylacetate copolymer (EVA), and an ionomer are desirable at the point of excelling in the crookedness-proof fatigability of the laminating packing material obtained; an oscillating-proof fatigability, etc.

[0049] Furthermore, when moldings, such as a film and a sheet, are once obtained from the resin constituent (pellet) obtained by the manufacturing method of this invention, and the extrusion coat of other base materials is carried out to this or it laminates the film of other base materials, a sheet, etc. using adhesives, the base materials (paper, a metallic foil, no extending, one shaft, biaxial-stretching plastic film or a sheet and its inorganic substance vacuum evaporation object, textile fabrics, a nonwoven fabric, metal curdy, wood quality, etc.) of arbitration are usable in addition to the aforementioned thermoplastics.

[0050] When the lamination of a layered product sets a (a1, a2, ...) and other base materials, for example, a thermoplastics layer, to b (b1, b2, ...) for the layer which consists of a resin constituent (pellet) obtained by the manufacturing method of this invention, If it has the shape of a film, a sheet, and a bottle, only not only in the two-layer structure of a/b The combination of a1-/b1/a2 / [b/a/b, a/b/a, a1 / a2/b, a/b1 / b2, b2/b1-/a/b1 / b2, b1/b2/a/b3 / b4, and] b2 grade arbitration is possible. In the shape of a filament, the combination of arbitration, such as a bimetal mold, a (Heart a)-sheath (b) mold, a (Heart b)-sheath (a) mold, or an eccentric sheath-core mold, has a and possible b.

[0051] In the above-mentioned lamination in addition, between each layer An adhesive resin layer can be prepared if needed. As this adhesive resin Although various things can be used, it changes with classes of resin of b and it cannot generally say The denaturation olefin system polymer containing the carboxyl group which is made to combine unsaturated carboxylic acid or its anhydride with an olefin system polymer (polyolefine system resin of an above-mentioned wide sense) chemically by the addition reaction, a graft reaction, etc., and is obtained can be mentioned. Specifically Maleic-anhydride graft denaturation polyethylene, maleic-anhydride graft denaturation polypropylene, A maleic-anhydride graft denaturation ethylene-propylene (block or random) copolymer, One sort or two sorts or more of mixture chosen from the maleic-anhydride graft denaturation ethylene-ethyl acrylate copolymer, the maleic-anhydride graft denaturation ethylene-vinylacetate copolymer, etc. is mentioned as a suitable thing. 0.001 - 3 % of the weight is desirable still more desirable, and the amount of the unsaturated carboxylic acid contained in the olefin system polymer at this time or its anhydride is 0.03 - 0.5 % of the weight especially preferably 0.01 to 1% of the weight. It worsens [when there are few amounts of denaturation in this denaturation object, an adhesive property may become inadequate, and / when many / conversely / a lifting and a moldability] crosslinking reaction and is not desirable. Moreover, it is also possible to blend rubber elastomer components, such as a resin constituent (pellet) obtained by the manufacturing method of this invention, other EVOH(s) and a polyisobutylene, and ethylene-propylene rubber, the resin of b more layers, etc. to these adhesive resin. It improves [an adhesive property] and is useful by blending especially different polyolefine system resin from the polyolefine system resin of the parent of adhesive resin.

[0052] Although the thickness of each class of a layered product can be generally said neither by lamination, the class of b, the application nor a container gestalt, the physical properties demanded, etc., a 5-500 micrometers (further 10-200 micrometers) layers are chosen, and 5-5000 micrometers (further 30-1000 micrometers) and an adhesive resin layer are usually chosen from the range of 5-400-micrometer (further 10-150 micrometers) extent for b layers. By less than 5 micrometers, gas barrier property runs short of a layers, and the thickness control becomes unstable. Conversely, if 500 micrometers is exceeded, a crookedness-proof fatigability is not inferior and economical and are not desirable. Moreover, when b layers run short of rigidity in less than 5 micrometers and exceed 5000 micrometers conversely, a crookedness-proof fatigability is inferior. And if weight becomes large, and an adhesive resin layer runs short of layer indirect arrival nature by less than 5 micrometers preferably, and the thickness control becomes unstable and 400 micrometers is exceeded conversely, it becomes large, and weight is not economical and desirable. Moreover, on each class of a layered product, the various above-mentioned additives, a modifier, a filler, other resin, etc. can also be added in the range which does not check the effectiveness of this invention for improvement in fabrication nature or many physical properties.

[0053] Although this layered product is used for the thing of various configurations as it is It is also desirable to perform extension processing, in order to improve the physical properties of this layered

product. Furthermore, about this extension You may be any of uniaxial stretching and biaxial stretching, and it is [having performed extension of a high scale factor way-wise / physical properties / as much as possible] good, and moldingses, such as an oriented film which is not produced [DERAMI / a pinhole, a crack, extension nonuniformity,] at the time of extension, an extension sheet, an extension container, and an extension bottle, are obtained.

[0054] As the extension approach, the high thing of draw magnification is also employable among deep drawing shaping besides being the roll extending method, the tenter extending method, the tubular extending method, the extension blowing method, etc., vacuum pressure sky shaping, etc. In the case of biaxial stretching, any method of a coincidence biaxial-stretching method and a serial biaxial-stretching method is employable. 60-170 degrees C of extension temperature are preferably chosen from the range of about 80-160 degrees C.

[0055] After extension is completed, it is also desirable to perform heat setting subsequently. Heat setting can be carried out with a well-known means, and it performs preferably 80-170 degrees C of about [a 2-600 second room] heat treatments at 100-160 degrees C, maintaining turgescence for the above-mentioned oriented film. For example, when obtaining a cup and a multilayer tray-like container from a multilayer sheet or a multilayer film, a draw-forming method is adopted and a vacuum-forming method, a pressure-forming method, the vacuum pressure sky fabricating method, the plug assist type vacuum pressure sky fabricating method, etc. are specifically mentioned.

[0056] Furthermore, when obtaining a tube and a multilayer bottle-like container from multilayer parison (preforming object of the shape of hollow tubing before a blow), a blow molding method is adopted, and an extrusion-blow-molding method, a cold-parison type (dual leadership type, metal mold portable type, parison shift expression, gyratory system, accumulator type, level parison type, etc.) blow molding method, an injection-blow-molding method, biaxial-stretching-blow-molding methods (an extrusion type cold-parison biaxial-stretching-blow-molding method, a injection type cold-parison biaxial-stretching-blow-molding method, injection-molding in-line type biaxial-stretching-blow-molding method, etc.), etc. are specifically mentioned.

[0057] Moreover, in using for heat shrink package applications, such as uncooked meat, processing meat, and a cheese head, after it considers as a product film, without carrying out and contains the above-mentioned uncooked meat, processing meat, a cheese head, etc. on this film, the heat setting after extension is 70-120 degrees C preferably, it performs heat treatment for about 2 - 300 seconds, carries out the heat shrink of this film, and carries out 50-130 degrees C of adhesion packages.

[0058] As a configuration of the layered product obtained in this way, you may be the thing of arbitration, and a film, a sheet, a tape, a bottle, a pipe, a filament, a variant cross-section extrusion object, etc. are illustrated. Moreover, the layered product obtained can perform heat treatment, cooling processing, rolling processing, printing processing, dry laminate processing, a solution or melting coat processing, bag manufacture processing, deep drawing, box processing, tube processing, split processing, etc. if needed.

[0059] Although the bag which consists of a container which consists of the cup obtained like the above, a tray, a tube, a bottle, etc., or an oriented film, and lid material are useful as various kinds of containers, such as fats-and-oils food, such as fermented foods, such as seasonings, such as mayonnaise besides common food, and a dressing, and bean paste, and salad oil, a drink, cosmetics, drugs, a detergent, perfumery and cosmetics, heavy chemicals, agricultural chemicals, and a fuel, especially the layered product of this invention is useful in containers, a fuel

[0060]

[Example] Hereafter, an example is given and this invention is explained concretely. In addition, especially, it shows weight criteria that it is with the "section" and "%" among an example, as long as there is no notice.

[0061] An example 1 [preparation of mixed liquor (B+C) of stratified inorganic compound (B) and water soluble resin (C)] natural (montmorillonite B) [degree of swelling (it measures according to the standard-testing-method constant volume method of Japanese bentonite Semiconductor Equipment & Materials International) The dispersion-liquid (8% of concentration) 80 section of 97ml / 2g] and water-

soluble nylon (C) -- (the Toray Industries, Inc. make -- "AQ-nylon [] -- mixed stirring of the water-solution (8% of concentration) 20 section of A-90") was carried out by the stirring iron pot, and mixed liquor (B+C) was obtained.

[0062] 99.8 mol %] was supplied to the twin screw extruder (30mmphi of ratio-of-length-to-diameter=42) from the hopper at a rate for 135 section/[the EVOH97 section (solid content)] whenever [[manufacture of resin constituent] content / EVOH(A) [ethylene / % and the saponification], the mixed liquor (B+C) obtained above was continuously supplied from the vent of this extruder at a rate for 38 section/, and melting mixing was performed. [of 28% of water content] [of 32 mols] The water content of the resin constituent at the time of melting mixing was 42%.

[0063] In addition, the laying temperature of 98 degrees C and the extruder outlet section was set [the temperature setting zone just behind the bottom of a hopper] as 90 degrees C for 50 degrees C and a temperature setup of pars intermedia (vent section). And the resin constituent was extruded and cut in the shape of a strand from the strand die formed in the outlet of an extruder, and the resin constituent pellet (cylindrical shape with; with a water content of 39% a diameter [of 2.5mm] and a die length of 3mm) was obtained.

[0064] In addition, the residence time within the extruder of a resin constituent was 3 minutes. Moreover, when whenever [ethylene content / of EVOH (A) / (32 mol %) and saponification], and (99.8-mol %) water content (28%) were substituted for (1) type in the text, it was what is set to 101.1 and satisfies (1) type. Subsequently, the pellet (0.3% of water content) of the resin constituent which performs a vacuum drying at 60 degrees C, and targets the obtained pellet was obtained.

[0065] The above-mentioned pellet was supplied to the single screw extruder, in T-pressure die casting, the film was produced under conditions with an extruder laying temperature of 220 degrees C, and the 30-micrometer film was obtained. The following evaluations were performed about the obtained film.

[0066] (Oxygen transmittance) The obtained film was measured under the conditions of 20 degrees C and 80%RH with the equal pressure method (MOCON law) using the product "OXTRAN 2/20" made from MOCON.

[0067] (Appearance property) It set on the obtained film, the diameter in 10cmx10cm measured the number of foreign matters 0.1mm or more, and the following criteria estimated.

O ... Less than [one piece] O ... 2 - 5 piece x ... Six or more pieces [0068] (Secondary elaboration nature) Visual observation of the appearance of the oriented film obtained at 165 degrees C in the obtained film (it judges in A4 size) by performing biaxial stretching twice as many length as this and horizontally [twice as many as this] was carried out, and the following criteria estimated.

O ... Generating of a stripe is not seen, either but it is good **... x as which generating of a stripe was regarded ... [0069] as which fracture was regarded In example 2 example 1, after drying mixed liquor (B+C) with the 80-degree C dryer and making water content into 0.3%, the extruder was supplied at a rate for 3 section/, it carried out similarly, and except having changed the laying temperature of pars intermedia (vent section) into 95 degrees C further, the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed. In addition, the water content of the resin constituent at the time of mixing was 27%, and the water content of the pellet before desiccation was 24%.

[0070] An example 3 [preparation of mixed liquor (B+C) of stratified inorganic compound (B) and water soluble resin (C)] natural (montmorillonite B) [degree of swelling (it measures according to the standard-testing-method constant volume method of Japanese bentonite Semiconductor Equipment & Materials International) The dispersion-liquid (6% of concentration) 70 section of 98ml / 2g] And the degree %, the average degree of polymerization 500, and oxyethylene radical 2.5 mol % content of 99 mols of polyvinyl alcohol system (resin C) (saponification, and the number of addition mols of oxyethylene carried out mixed stirring of the water-solution (6% of concentration) 30 section of an average of 10) by the stirring iron pot, and mixed liquor (B+C) was obtained.

[0071] 99.7-mol % of EVOH (A) is used whenever [ethylene content % and saponification] at 26% of [manufacture of resin constituent] water content. [of 29 mols] The mixed liquor (B+C) which considered the input as a part [the EVOH98 section (solid content)] for 132 section/, and was obtained

above at a rate for 33 section/ From the vent of this extruder, except having changed the laying temperature of pars intermedia (vent section) into 110 degrees C further, it supplied continuously, and it carried out similarly, and the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed.

[0072] In addition, the water content of the resin constituent at the time of mixing was 39%, and the water content of the pellet before desiccation was 35%, and when whenever [ethylene content / of EVOH (A) / (29 mol %) and saponification], and (99.7-mol %) water content (26%) were substituted for (1) type in the text, it was what is set to 109.7 and satisfies (1) type.

[0073] In example 4 example 1, after drying mixed liquor (B+C) with the 90-degree C dryer and making water content into 0.2%, the extruder was supplied at a rate for 1.8 section/, it carried out similarly, and except having changed the laying temperature of pars intermedia (vent section) into 100 degrees C further, the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed.

[0074] In addition, the water content of the resin constituent at the time of mixing was 27%, and the water content of the pellet before desiccation was 24%.

[0075] example 5 [preparation of mixed liquor (B+C) of stratified inorganic compound (B) and water soluble resin (C)] Na mold fluorine 4 silicon mica (B) [-- 96ml / 2g] a degree of swelling (it measures according to the standard-testing-method constant volume method of Japanese bentonite Semiconductor Equipment & Materials International) the dispersion-liquid (4.5% of concentration) 60 section and water-soluble nylon (C) -- (-- the Toray Industries, Inc. make -- " -- AQ-nylon [] -- mixed stirring of the water-solution (4.5% of concentration) 40 section of A-90") was carried out by the stirring iron pot, and mixed liquor (B+C) was obtained.

[0076] Using the mixed liquor (B+C) of [manufacture of resin constituent] above, it carried out like the example 1, and the pellet (0.3% of water content) of supply] and a resin constituent was obtained for [, however mixed liquor (B+C) to the extruder at a rate for 33 section/, and the same evaluation as an example 1 was performed. In addition, the water content of the resin constituent at the time of mixing was 41%, and the water content of the pellet before desiccation was 37%.

[0077] In example 6 example 1, after drying mixed liquor (B+C) with the 70-degree C dryer and making water content into 1%, the extruder was supplied at a rate for 1.5 section/, it carried out similarly, and except having changed the laying temperature of pars intermedia (vent section) into 105 degrees C further, the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed. In addition, the water content of the resin constituent at the time of mixing was 27%, and the water content of the pellet before desiccation was 22%.

[0078] In example 7 example 1, using ethylene content % of EVOH of 38 mols (A), it carried out similarly, and the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed except having made the water content into 25%.

[0079] In addition, the water content of the resin constituent at the time of mixing was 40%, and the water content of the pellet before desiccation was 36%, and when whenever [ethylene content / of EVOH (A) / (38 mol %) and saponification-], and (99.8-mol %) water content (25%) were substituted for (1) type in the text, it was what is set to 101.7 and satisfies (1) type.

[0080] In example 8 example 1, except having used 98-mol % of EVOH (A) whenever [saponification], it carried out similarly, and the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed.

[0081] In addition, the water content of the resin constituent at the time of mixing was 40%, and the water content of the pellet before desiccation was 37%, and when whenever [ethylene content / of EVOH (A) / (32 mol %) and saponification], and (98-mol %) water content (28%) were substituted for (1) type in the text, it was what is set to 81.4 and satisfies (1) type.

[0082] In example of comparison 1 example 1, except having used EVOH (A) of 60% of water content, it carried out similarly, and the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed. In addition, the water content of the resin constituent at the time of mixing was 64%, and the water content of the pellet before desiccation was

61%.

[0083] In example of comparison 2 example 1, the natural montmorillonite (B) was similarly performed except it having been powdered and having supplied the direct extrusion machine, the resin constituent was obtained, the same evaluation as an example 1 was performed, the pellet (0.3% of water content) of a resin constituent was obtained, and the same evaluation as an example 1 was performed. In addition, the water content of the resin constituent at the time of mixing was 27%, and the water content of the pellet before desiccation was 24%.

[0084] The result of an example and the example of a comparison is shown in Table 1.

[0085]

[Table 1]

Oxygen transmittance An appearance property Secondary elaboration nature (cc, 30 micrometer/m 2, and day-atm) An example 1 0.1 O O ** 2 0.1 O O ** 3 0.2 O O ** 4 0.3 O O ** 5 0.1 O O ** 6 0.2 O O ** 7 0.3 O O ** 8 0.3O Example 1 of O comparison 0.8 x x ** 2 0.4O ** [0086]

[Effect of the Invention] In the manufacture approach of this invention manufacturing the resin constituent which comes to contain an EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) Since melting mixing of the EVOH(A) water bloating tendency stratified inorganic compound (B) and water soluble resin (C) of 50 or less % of the weight of water content is carried out, The obtained resin constituent is what shows the secondary elaboration nature which was excellent in gas barrier property or an appearance property, and was further excellent. A film, a sheet, or a container is presented and it is useful as various kinds of wrapping, such as common food, a pouch-packed food, drugs, heavy chemicals, and agricultural chemicals, and it is also effective to carry out a laminating to various resin and to use, and it is useful in especially containers, such as a gas tank and an agricultural-chemicals bottle. [of these resin constituents]

[Translation done.]